

CLAIM AMENDMENTS

Claims 1- 8 (canceled).

Claim 9 (currently amended): A gearshift control system for a hybrid-drive electric vehicle, the vehicle comprises an engine having an output shaft, a transmission having an input shaft and an output shaft, [[for]] the transmission changing and transmitting a rotation of [[an]] the input shaft to wheels via [[an]] the output shaft, the transmission having gear positions including a neutral position and selectively applying one of the gear positions according to a gear shift request, a clutch for connecting and disconnecting power transmission between the output shaft of the engine and the input shaft of the transmission, a rotating electric machine connected to the input shaft of the transmission via gears for operating as an electric motor and an electric generator, a storage element for storing an electric power supplied from the rotating electric machine, the system comprising:

determining means for determining whether or not the gear shifting request of the transmission exists;

clutch disconnection means for disconnecting the clutch upon the gear shifting request of the transmission;

neutral position setting means for changing over the gear position of the transmission to the neutral position when the clutch has been disconnected;

mode selecting means for selectively operating the rotating electric ~~generator~~ machine in a motor mode and in a power generating mode so that a rotational speed of the input shaft of the transmission reaches a region of a synchronizing rotational speed

depending on a requested gear position; and

gear setting means for setting the gear position of the transmission from the neutral position to the requested gear position,

wherein:

the gear positions of the transmission include a vehicle-starting gear position;

the determining means determines if the gear shifting request is a request to the vehicle-starting gear position, and if the request to the vehicle-starting gear position exists in a vehicle stationary state where the engine is running idle, the transmission is in the neutral position, and the clutch is connected; and

when the request to the vehicle-starting gear position exists in the vehicle stationary state,

the clutch disconnection means disconnects the clutch,

the mode selecting means operates the rotating electric machine in the power generating mode to decrease the rotational speed of the input shaft until the rotational speed of the input shaft reaches the region of the synchronizing rotational speed in the vicinity of a zero value after the clutch means disconnects the clutch, and

the gear setting means sets the gear position of the transmission from the neutral position to the vehicle-starting gear position when the rotational speed of the input shaft reaches the region of the synchronizing rotational speed in the vicinity of a zero value.

Claims 10 - 14 (canceled).

Claim 15 (previously presented): The gearshift control system according to claim 9, wherein:

the clutch disconnection means is configured, when the gear shifting request of the transmission has been determined to exist, to disconnect the clutch and maintain the clutch disconnected until gear setting to the requested gear position completes, if the vehicle is traveling by an output of the engine, and to disconnect the clutch and maintain the clutch disconnected even after gear setting to the requested gear position completes, if the vehicle is traveling by an output of the rotating electric machine.

Claim 16 (previously presented): The gearshift control system according to claim 9, wherein:

the storage element comprises an electric double layer capacitor.

Claim 17 (currently amended): A gearshift control system for a hybrid-drive electric vehicle, the vehicle comprises an engine having an output shaft; a transmission having an input shaft and an output shaft, the transmission ~~[[for]]~~ changing and transmitting a rotation of ~~[[an]]~~ the input shaft to wheels via ~~[[an]]~~ the output shaft, the transmission having gear positions including a neutral position and selectively applying one of the gear positions according to a gear shift request, a clutch for connecting and disconnecting power transmission between the output shaft of the engine and the input shaft of the transmission, a rotating electric machine connected to the input shaft of the transmission via gears for operating as an electric motor and an electric generator, a

storage element for storing an electric power supplied from the rotating electric machine, the system comprising:

a programmable controller programmed to:

determine whether or not the gear shifting request of the transmission exists;

disconnect the clutch upon the gear shifting request of the transmission;

change over the gear position of the transmission to the neutral position when the clutch has been disconnected;

selectively operate the rotating electric generator in a motor mode and in a power generating mode so that a rotational speed of the input shaft of the transmission reaches a region of a synchronizing rotational speed depending on a requested gear position; and

set the gear position of the transmission from the neutral position to the requested gear position,

wherein the gear positions of the transmission include a vehicle-starting gear position; and

wherein the controller is further programmed to:

determine if the gear shifting request is a request to the vehicle-starting gear position, and if the request to the vehicle-starting gear position exists in a vehicle stationary state where the engine is running idle, the transmission is in the neutral position, and the clutch is connected; and

when the request to the vehicle-starting gear position exists in the vehicle stationary state.

disconnect the clutch,
operate the rotating electric machine in the power generating mode
to decrease the rotational speed of the input shaft until the rotational
speed of the input shaft reaches the region of the synchronizing rotational
speed in the vicinity of a zero value after the clutch is disconnected, and
set the gear position of the transmission from the neutral position to
the vehicle-starting gear position when the rotational speed of the input
shaft reaches the region of the synchronizing rotational speed in the
vicinity of a zero value.

Claim 18 (currently amended): A gearshift control method for a hybrid-drive electric vehicle, the vehicle comprises an engine having an output shaft; a transmission having an input shaft and an output shaft, the transmission ~~[[for]]~~ changing and transmitting a rotation of ~~[[an]]~~ the input shaft to wheels via ~~[[an]]~~ the output shaft, the transmission having gear positions including a neutral position and selectively applying one of the gear positions according to a gear shift request, a clutch for connecting and disconnecting power transmission between the output shaft of the engine and the input shaft of the transmission, a rotating electric machine connected to the input shaft of the transmission via gears for operating as an electric motor and an electric generator, a storage element for storing an electric power supplied from the rotating electric machine, the method comprising:

determining whether or not the gear shifting request of the transmission exists;
disconnecting the clutch upon the gear shifting request of the transmission;

changing over the gear position of the transmission to the neutral position when the clutch has been disconnected;

selectively operating the rotating electric generator in a motor mode and in a power generating mode so that a rotational speed of the input shaft of the transmission reaches a region of a synchronizing rotational speed depending on a requested gear position; and

setting the gear position of the transmission from the neutral position to the requested gear position,

wherein the gear positions of the transmission include a vehicle-starting gear position; and

wherein the method further comprises:

determining if the gear shifting request is a request to the vehicle-starting gear position, and if the request to the vehicle-starting gear position exists in a vehicle stationary state where the engine is running idle, the transmission is in the neutral position, and the clutch is connected; and

when the request to the vehicle-starting gear position exists in the vehicle stationary state,

disconnecting the clutch,

operating the rotating electric machine in the power generating mode to decrease the rotational speed of the input shaft until the rotational speed of the input shaft reaches the region of the synchronizing rotational speed in the vicinity of a zero value after the clutch is disconnected, and

setting the gear position of the transmission from the neutral position to

the vehicle-starting gear position when the rotational speed of the input shaft reaches the region of the synchronizing rotational speed in the vicinity of a zero value.